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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/074,642	02/12/2002	Christian L. Belady	10018060-1	7173

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EXAMINER

DUONG, THO V

ART UNIT PAPER NUMBER

3743

DATE MAILED: 06/03/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/074,642

Applicant(s)

BELADY ET AL.

Examiner

Tho v Duong

Art Unit

3743

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 13 May 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 3,4,11-15 and 20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,5-10 and 16-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## DETAILED ACTION

### *Election/Restrictions*

Claims 3-4, 11-15 and 20 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected species, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in Paper No. 3.

Applicant's election with traverse of species of figure 3 and subspecies I in Paper No. 3 is acknowledged. The traversal is on the ground(s) that the requirement for election does not establish reasons for insisting upon election. This is not found persuasive because the examiner already stated in the election requirement that these species with combination of subspecies are patentably distinct species, which is the basis for the restriction. As regarding to the clarification of the "non-illustrated", the spring element (60), which is shown in figure 4, is a generic figure of the spring element. However, the material of the spring element has not been shown, which can be shown in the figure by cross-hatching section.

The requirement is still deemed proper and is therefore made FINAL.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 5, 7, 8, 9, 10, 16-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Chu (US 4,226,281). Chu discloses (figures 1-6) a thermal interface (10) comprising a thermal spreader (18) forming a plurality of passageways (22); a spring element such as layer with a

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substantially planar face of sponge like material (36) coupled with the spreader (18); and a plurality of thermally conductive cylindrical pins (24) for the passageways and perpendicular with the planar face of the spring element (35); each of the pins (24) having a head (25) and a shaft moving with the spring element (36); at least part of the shaft being internal to the passageway and forming a gap between the pin (24) and the gap (22), wherein the pin heads (22) collectively and macroscopically conform to an object (12,14) couple thereto; the head (25) protruding from the face of the spring element (36) in a direction away from the spreader (18); the object comprising a plurality of semiconductor packages and dies (12). Chu further discloses (column 5, lines 24-27) that if the heat spreader (18) is not sufficient for removing the heat, another heat sink such as fins or a small cold plate can be attached to the spreader (18). Regarding claim 16, Chu discloses (column 4, lines 20-37) that the chips (12) have tilted and no absolute flat surfaces, which form uneven surfaces on the chips. The chips (12) are also inherently to have uneven surfaces due to variation in height and tilt of the chips occur due to assembly accuracies. (See 5,705,850). Regarding claims 17-19, Chu has disclosed all of the structural limitations of the invention. Therefore, it is inherently that Chu's reference is considered to anticipate the claimed method, which includes all of the anticipated apparatus limitations.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 6 is rejected under 35 U.S.C. 103(a) as obvious over Chu (US 4,226,281). Chu substantially disclose all of applicant's claimed invention except for the limitation that the pin shaft and the passageways being substantially rectangular. At the time the invention was made, it would have been an obvious matter of design choice to a person of ordinary skill in the art to change the shape of the pins and the passageways from cylindrical to rectangular because applicant has not disclose that the rectangular shape provide an advantage, is used for a particular purpose, or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected applicant's invention to perform equally well with any shape of the pins and the passageways because the ability to transfer heat from the object (12) to the heat spreader (18) is not effected by the shape of the pins and the passageways.

### *Conclusion*

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

DiStefano et al. (US 5,650,914) discloses a compliant thermal connector for varied chip heights.

Gupta (US 4,235,283) discloses multi-stud thermal conduction module.

Meagher et al. (US 4,462,462) discloses a thermal conduction piston for semiconductor packages.

Novak et al. (US 4,067,042) discloses heat sink mechanism to make sure a firm thermal contact between a pin and a heat source.

Ashiwake et al. (US 5,705,850) discloses semiconductor module that has varied chip heights.

Cole et al. (US 4,246,597) discloses an air cooled multi-chip module having a heat conductive piston spring loaded against the chips.

Chu et al. (US 5,161,089) discloses a spring disposed inside a stud to press against the chips.

Any inquiry concerning this communication or earlier communication from the examiner should be directed to Tho Duong whose telephone number is (703) 305-0768. The examiner can normally be reached on from 9:30-6 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Henry Bennet, can be reached on (703) 308-0101. The fax phone number for the organization where this application or proceeding is assigned is (703)308-7764.

Any inquiry of a general nature or relating to status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0861.

Tho Duong

May 22, 2003

Henry Bennett  
Supervisory Patent Examiner  
Group 3700

